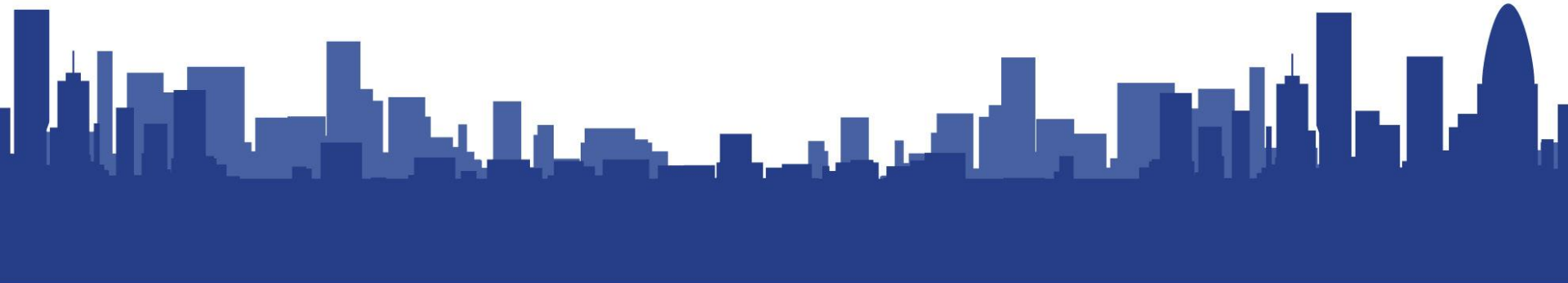




2013 BBA Efficiency Forum Refrigeration Project Team


Day 1 Breakout: Compressor Rack Standardization




Efficiency Forum Breakout Session Agenda

Session	Day	Time	Topic	Attendees
II	May 29	3:00-4:15 PM	Compressor rack standardization	BBA Members
III	May 30	10:15-11:45 AM	Review of current projects and key industry issues	BBA Members, Suppliers
IV	May 30	1:15-2:30 PM	Compressor rack standardization	BBA Members, Suppliers

Today's Session



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Introduction: BBA RPT Project Status Update

Project	Status	Key Questions
Retrofitting open medium temperature cases with display doors	<ul style="list-style-type: none"> • Guide published 11/12 • Working with industry, end-users, utilities to deploy 	<ul style="list-style-type: none"> • What can BBA do to enhance deployment and market acceptance?
Refrigeration system commissioning guide (in collaboration with ASHRAE)	<ul style="list-style-type: none"> • 90% draft is complete • Peer review ended 5/4 • Publication by end of 2013 	<ul style="list-style-type: none"> • How can BBA facilitate usage of the guide once published?
Compressor racks challenge	<ul style="list-style-type: none"> • Preliminary draft developed • Initial input received from industry and other stakeholders 	<ul style="list-style-type: none"> • What feedback to RPT members have on the draft spec? • How can the spec be better aligned to end-user needs?
Alternative refrigerant system case studies (in collaboration with EPA GreenChill)	<ul style="list-style-type: none"> • Initial candidate stores selected and contacted • Delayed due to internal issues 	<ul style="list-style-type: none"> • Do members have stores they would like to feature? • Are there other sources for candidate stores?

Introduction: Key Questions

- ▶ General key questions common to all ongoing activities:
 - How can the BBA's efforts be better aligned with member needs?
 - What steps can BBA take to encourage and enhance adoption of its outputs?
 - How do we gauge and measure market acceptance of these energy-saving technologies and practices?
- ▶ Member inputs on these topics will help ensure that DOE resources translate into quantifiable energy savings for members and other end users.
- ▶ Please keep these key questions in mind throughout the duration of the Forum!



Compressor Rack Standardization

Facilitator: Mike Guldenstern, e2s

- ▶ **Current Technology:** The majority of compressor racks in the U.S. are to some extent custom designs
 - End users tailor designs to physical store layout, location (climate), and technology preferences (refrigerants, etc.)
 - Significant design variation can be found even within stores of the same operator
- ▶ **Issues:** Custom rack design can lead to a number of issues during each phase of the product life cycle
 - Design: additional manpower and resources needed to develop unique designs
 - Installation and commissioning: higher potential for errors and missteps due to unique equipment features
 - Operations and maintenance: unfamiliarity with rack design and lack of comparable benchmark data lead to suboptimal operation and maintenance issues
- ▶ **Suggestion:** Move industry towards a higher level of standardization in hardware and operations.

Compressor Rack Standardization: Member Opinions

- ▶ What do members think about a move towards compressor rack standardization?
 - To what extent is it feasible?
 - What are the major hurdles – both to end users and to suppliers?
 - What should be the key areas of focus?
 - In what aspects of design or operations (components, processes) could the largest savings be realized?

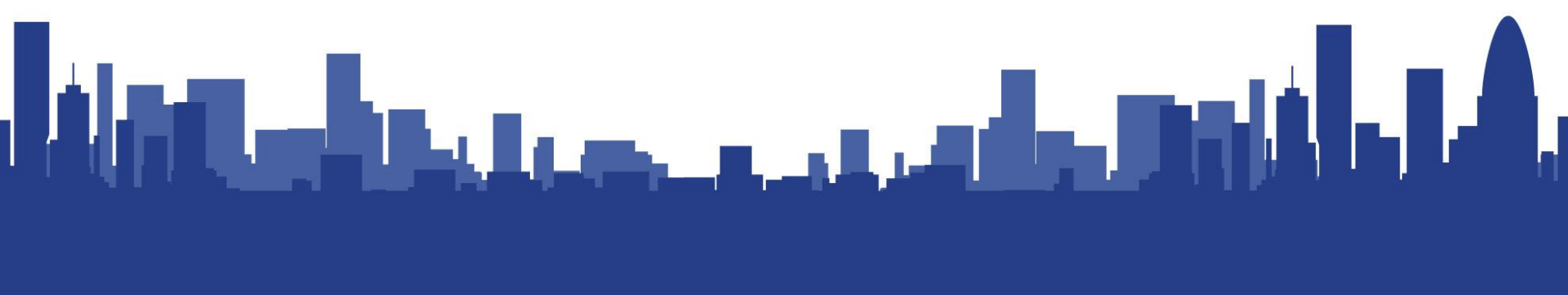
- ▶ What should the first steps be?
 - What form should the process take?
 - How would we initiate the process with industry?
 - How can we approach the major challenges?

- ▶ DOE is currently working on a high-efficiency rack challenge specification. Could this be a venue to work towards increased standardization?



2013 BBA Efficiency Forum Refrigeration Project Team


Day 2, Breakout III: Review of Current Projects and Key Issues




Efficiency Forum Breakout Session Agenda

Session	Day	Time	Topic	Attendees
II	May 29	3:00-4:15 PM	Compressor rack standardization	BBA Members
III	May 30	10:15-11:45 AM	Review of current projects and key industry issues	BBA Members, Suppliers
IV	May 30	1:15-2:30 PM	Compressor rack standardization	BBA Members, Suppliers

Today's Session



Session	Day	Time	Topic	Attendees
II	May 29	3:00-4:15 PM	Compressor rack standardization	BBA Members
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Review of Current BBA RPT Projects

- ▶ The BBA Refrigeration Project Team currently has a number of projects in various stages of development and deployment.
 - **Open Case Retrofits:** Outlining best practices for retrofitting existing open medium temperature display cases with doors and helping to enhance market acceptance of this technology.
 - **Refrigeration System Commissioning Guide:** Collaborating with ASHRAE to develop and deploy a guide to best practices for commercial refrigeration system installation and commissioning.
 - **Compressor Racks Challenge:** Developing a high-efficiency compressor rack specification which challenges equipment manufacturers to push the limits of existing energy-efficiency technologies.
 - **Alternative Refrigerant Case Studies:** Collaborating with EPA's GreenChill partnership to showcase retail refrigeration systems combining high efficiency and low-GWP performance

Project Review: Open Case Retrofits

► Past Work:

- Collaborated with BBA members and suppliers to develop best practices guide for open case retrofits (published November 2012)
- Conducted promotional activities including webinars, CEE utility roundtable discussion, and coordination with *ACHR News* and RSES to publish articles on guide

► Current Status:

- Continuing collaboration with trade organizations, utilities, end users, and other groups to increase market acceptance of retrofits

► Next Steps:

- Continue promotional activities

► Key Questions:

- What promotional activities would best drive and deployment of this technology?
- How can DOE quantify and gauge the results of its efforts in promoting retrofits?



Photo Credit: REMIS AMERICA, LLC.

Project Review: Refrigeration System Commissioning Guide

► **Past Work:**

- Initiated collaboration with ASHRAE; formed project committee
- Released and conducted peer review of 60% and 90% draft guides

► **Current Status:**

- Developing final version of draft for release

► **Next Steps:**

- Publish guide
- Promote use of guide and best practices

► **Key Questions:**

- What channels should DOE take in order to facilitate awareness and utilization of the guide and best practices for commissioning?



Photo Credit: groceryheadquarters.com

Project Review: Compressor Racks Challenge

► Past Work:

- Conducted discussions with suppliers, designers, and retailers to understand project scope and key requirements
- Drafted initial version of spec (presented today)

► Current Status:

- Seeking input from end users and suppliers on improvements to the draft spec

► Next Steps:

- Publish updated draft version of spec for RPT member and industry review
- Release final spec and initiate challenge

► Key Questions:

- What technologies or system features are currently missing from the spec?
- Should any changes be made to how the spec is currently structured?



Photo Credit: Kysor/Warren

Project Review: Alternative Refrigerant Case Studies

► Past Work:

- Communicated with EPA GreenChill to facilitate collaboration
- Selected and contacted several candidate store; began initial information-sharing steps

► Current Status:

- Delayed due to internal issues at candidate stores

► Next Steps:

- Locate and secure agreement from additional subject stores for case studies

► Key Questions:

- Do any BBA members have stores featuring high-efficiency alternative refrigerant systems which they would like to showcase?
- Have any suppliers provided systems to end users who might be interested in being the subject of a case study?



*Photo Credit: U.S. EPA GreenChill
Partnership*

Key Questions

- ▶ General key questions common to all ongoing activities:
 - How can the BBA's efforts be better aligned with member needs?
 - What steps can BBA take to encourage and enhance adoption of its outputs?
 - How do we gauge and measure market acceptance of these energy-saving technologies and practices?

- ▶ Member inputs on these topics will help ensure that DOE resources translate into quantifiable energy savings for members and other end users.

- ▶ Please keep these key questions in mind during today's discussion!

► What are the current pressing issues in the industry?

– Operators:

- Equipment designs
- Emerging technologies
- Best practices
- Knowledge issues (O&M, etc.)

– Suppliers:

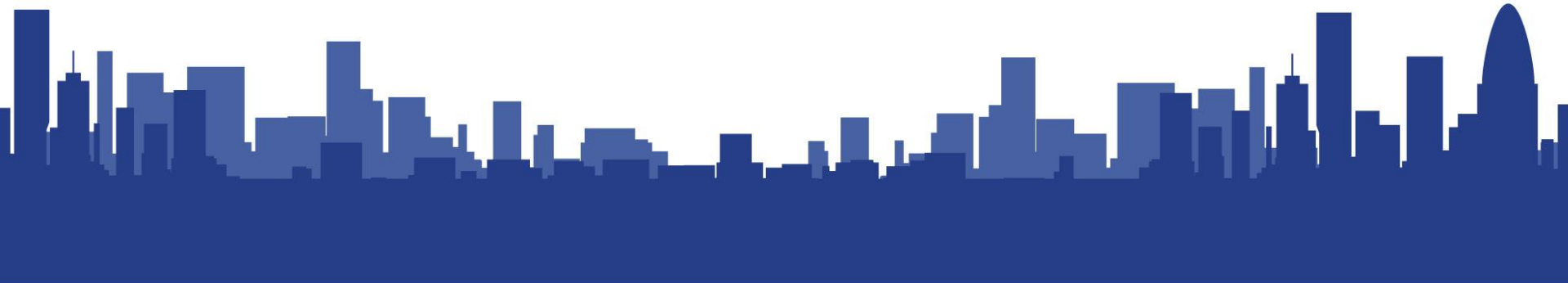
- Newly commercialized technologies
- Data/demonstration needs
- Customer needs

How can BBA work to align end user needs and supplier capabilities to further the state of energy efficiency in the retail refrigeration sector?



2013 BBA Efficiency Forum Refrigeration Project Team

Day 2, Breakout IV: Compressor Rack Standardization



Efficiency Forum Breakout Session Agenda

Session	Day	Time	Topic	Attendees
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Compressor Racks Challenge Spec – Project Timeline

Challenge Spec Development and Deployment Process



- ▶ In developing a draft racks spec, DOE has thus far:
 - Researched industry literature
 - Interviewed manufacturers, designers, and purchasers of compressor racks
 - Provided initial drafts to industry experts for review
- ▶ Draft spec has been distributed to attendees in advance of this meeting
 - Uses a points system to quantify system performance level based on feature set
 - Includes features onboard the rack, as well as external features which could be specified in conjunction with the rack
 - Allows for multiple design pathways to achieve performance targets

Compressor Racks Challenge Spec – Key Issues

In today's session, DOE would like to solicit feedback on issues integral to the racks spec:

▶ **Scope:**

- What is the appropriate boundary for the scope of the spec?
- What features external to the rack can be reliably included in the requirement?
- What features are outside the control of the rack assembler?

▶ **Layout:**

- Is the points system appropriate?
- What adjustments should be made to the point values assigned to various technologies?
- What score should a system be required to attain in order to meet the challenge?

▶ **Technical Content:**

- Are there any inapplicable technologies included? Any applicable technologies missing?
- What adjustments should be made to the technical specifications (set points, etc.) listed?
- Are there attributes aside from efficiency which would drive or limit use of these features?

Compressor Rack Standardization

Facilitator: Mike Guldenstern, e2s

- ▶ **Current Technology:** The majority of compressor racks in the U.S. are to some extent custom designs
 - End users tailor designs to physical store layout, location (climate), and technology preferences (refrigerants, etc.)
 - Significant design variation can be found even within stores of the same operator
- ▶ **Issues:** Custom rack design can lead to a number of issues during each phase of the product life cycle
 - Design: additional manpower and resources needed to develop unique designs
 - Installation and commissioning: higher potential for errors and missteps due to unique equipment features
 - Operations and maintenance: unfamiliarity with rack design and lack of comparable benchmark data lead to suboptimal operation and maintenance issues
- ▶ **Suggestion:** Move industry towards a higher level of standardization in hardware and operations.

Compressor Rack Standardization

- ▶ In yesterday's breakout discussion, members provided their thoughts on a move in the direction of standardization, discussing:
 - To what extent is it feasible?
 - What are the major hurdles – both to end users and to suppliers?
 - What should be the key areas of focus?
 - In what aspects of design or operations (components, processes) could the largest savings be realized?

- ▶ Members discussed potential first steps towards standardization, including:
 - What form should the process take?
 - How would we initiate the process with industry?
 - How can we approach the major challenges?

Compressor Rack Standardization

- ▶ Today, we are joined by suppliers from the retail refrigeration sector and would like their perspective on this issue
- ▶ In particular, we would like to hear the supplier community's thoughts on:
 - What are the technical and market barriers to product standardization?
 - Are there areas where potential collaboration across the industry would yield benefits to all parties without lessening competition?
 - Would standardization of service/maintenance practices be more realistic than standardization of hardware?
 - Some level of hardware harmonization would still be needed
 - What would this entail?

Compressor Rack Standardization

- ▶ What are the areas of agreement between end users and suppliers?
 - Best practices for design?
 - Operational and maintenance procedure standardization?
 - Hardware synchronization and interchangeability?

- ▶ What are the reasonable first steps?
 - We understand that product development life cycles are long
 - What would feasible near-term, intermediate, and long-term goals be?
 - Are service practices the area with the lowest barriers to entry?

- ▶ What can the DOE BBA do to facilitate growth of common practices and synchronized hardware across the industry, driving higher performance and reducing service and operational issues?